

What is claimed is:

SUB A17  
1. A file management apparatus which stores and manages file storage positions in a one-to-one correspondence with file names and accesses files that correspond to specified file names, the file management apparatus comprising:

2 a file storage unit operable to store files which each include a plurality of numbered pieces of data;

3 a position information storage unit operable to store pieces of position information that indicate segment storage positions in the file storage unit, the pieces of position information being in a one-to-one correspondence with segment names, and each segment being a set of pieces of data having consecutive numbers;

4 an access request receiving unit operable to receive a segment access request specifying a segment name;

5 a position information read unit operable to read, from the position information storage unit, a piece of position information corresponding to the segment name specified in the segment access request; and

6 a segment access unit operable to access a segment in the file storage unit by referring to the read piece of position information.

7 2. A file management apparatus which stores and manages file storage positions in a one-to-one correspondence with file names

3 and accesses files that correspond to specified file names, the  
4 file management apparatus comprising:

5 a file storage unit operable to store files which each  
6 include a plurality of pieces of data that have each been assigned  
7 a timecode;

8 a position information storage unit operable to store  
9 pieces of position information that indicate segment storage  
10 positions in the file storage unit, the pieces of position  
11 information being in a one-to-one correspondence with segment  
12 names, each segment being a set of pieces of data having  
13 consecutive timecodes;

14 an access request receiving unit operable to receive a  
15 segment access request specifying a segment name;

16 a position information read unit operable to read, from  
17 the position information storage unit, a piece of position  
18 information corresponding to the segment name specified in the  
19 segment access request; and

20 a segment access unit operable to access a segment in  
21 the file storage unit by referring to the read piece of position  
22 information.

1 3. The file management apparatus of Claim 2, wherein

2 each piece of segment position information includes (1)  
3 an address indicating a file start storage position of a file to  
4 which the segment belongs, and either (2) (a) an address offset

5 indicating a size of a portion between the file start and a start  
6 of the segment and (b) an address offset indicating a size of a  
7 portion between the file start and an end of the segment, or (2-2)  
8 (a) an address offset indicating a size of a portion between the  
9 file start and a start of the segment and (c) a size of the  
10 segment.

1 4. The file management apparatus of Claim 3, wherein  
2 the position information storage unit stores the pieces  
3 of position information in the same order as the segments for each  
4 file, and

5 the file management apparatus further comprising:  
6 a receiving unit operable to receive a segment name  
7 obtainment request; and

8 a segment name output unit operable to, after the  
9 receiving unit receives the segment name obtainment request, refer  
10 to the position information storage unit and output to outside the  
11 file management apparatus a list of segment names which each  
12 include at least (1) a file name of a file to which the segment  
13 belongs and (2) a character sequence which indicates a position of  
14 the segment in one or more segments belonging to the file.

1 5. The file management apparatus of Claim 4, wherein  
2 the position information storage unit stores a table  
3 showing relationships between (1) file names of files to which the

4 segments belong, (2) serial numbers of the segments in the files  
5 which are assigned in order of storage in the files, and (3)  
6 pieces of position information, and

7 the position information read unit, after receiving a  
8 segment name, refers to the table to detect a piece of position  
9 information that corresponds to a file name and a serial number of  
10 the segment which are included in the segment name, and reads the  
11 detected piece of position information from the table.

1 6. A file management apparatus which stores and manages file  
2 storage positions in a one-to-one correspondence with file names  
3 and accesses files that correspond to specified file names, the  
4 file management apparatus comprising:

5 a file storage unit operable to store files which each  
6 include a plurality of pieces of data that have each been assigned  
7 a timecode;

8 a first position information storage unit operable to  
9 store pieces of position information that indicate file storage  
10 positions in the file storage unit, the pieces of position  
11 information being in a one-to-one correspondence with file  
12 names;

13 a second position information storage unit operable to  
14 store pieces of position information that indicate segment storage  
15 positions in the file storage unit, the pieces of position  
16 information being in a one-to-one correspondence with segment

17 names, and each segment being a set of pieces of data having  
18 consecutive timecodes;

19 an access request receiving unit operable to receive an  
20 access request specifying an access target name which is either a  
21 segment name or a file name;

22 a judgement unit operable to judge whether the access  
23 target name is a segment name or a file name;

24 a position information read unit operable to read, from  
25 either the first position information storage unit or the second  
26 position information storage unit, a piece of position information  
27 corresponding to the access target name judged by the judgement  
28 unit; and

29 an access unit operable to access either a segment or  
30 a file stored in the file storage unit by referring to the read  
31 piece of position information.

1 7. The file management apparatus of Claim 6, wherein

2 the judgement unit judges that the access target name  
3 is a segment name when the access target name includes a name of  
4 a file stored in the file storage unit and a character sequence  
5 indicating a serial number of a segment in the file.

1 8. A file management apparatus which stores and manages file  
2 storage positions in a one-to-one correspondence with file names  
3 and accesses files that correspond to specified file names, the

4 file management apparatus comprising:

5 a file obtaining unit operable to obtain files which  
6 each include a plurality of pieces of video data that have each  
7 been assigned a timecode, and store the obtained files in a file  
8 storage unit;

9 the file storage unit operable to store the obtained  
10 files;

11 a position information obtaining unit operable to  
12 recognize each set of pieces of data having consecutive timecodes  
13 as a segment, obtain pieces of position information that indicate  
14 segment storage positions in the file storage unit, and store the  
15 obtained pieces of position information in a position information  
16 storage unit;

17 the position information storage unit operable to store  
18 the obtained pieces of position information;

19 a segment access request receiving unit operable to  
20 receive a segment access request specifying a segment;

21 a position information read unit operable to read, from  
22 the position information storage unit, a piece of position  
23 information corresponding to the segment specified in the segment  
24 access request; and

25 a segment access unit operable to access the segment in  
26 the file storage unit by referring to the read piece of position  
27 information.

1 9. A file management apparatus which stores and manages file  
2 storage positions in a one-to-one correspondence with file names  
3 and accesses files that correspond to specified file names, the  
4 file management apparatus comprising:

5 a file obtaining unit operable to obtain files which  
6 each include a plurality of pieces of video data that have each  
7 been assigned a timecode, and store the obtained files in a file  
8 storage unit;

9 the file storage unit operable to store the obtained  
10 files;

11 a segment identifying unit operable to recognize each  
12 set of pieces of video data having consecutive timecodes as a  
13 segment;

14 a position information creating unit operable to create  
15 pieces of position information that indicate storage positions of  
16 the identified segments in the file storage unit, and store the  
17 created pieces of position information in a position information  
18 storage unit;

19 the position information storage unit operable to store  
20 the created pieces of position information;

21 a segment access request receiving unit operable to  
22 receive a segment access request specifying a segment;

23 a position information read unit operable to read, from  
24 the position information storage unit, a piece of position  
25 information corresponding to the segment specified in the segment

26 access request; and

27 a segment access unit operable to access the segment in  
28 the file storage unit by referring to the read piece of position  
29 information.

1 10. A file management apparatus which stores and manages file  
2 storage positions in a one-to-one correspondence with file names  
3 and accesses files that correspond to specified file names, the  
4 file management apparatus comprising:

5 a file storage unit operable to store files which each  
6 include one or more segments that are each a logical unit;

7 a position information storage unit operable to store  
8 pieces of position information that indicate segment storage  
9 positions in the file storage unit;

10 an access request receiving unit operable to receive a  
11 segment set access request specifying a segment set name, each  
12 segment set being composed of all segments in a file, and each  
13 segment set name including a name of the file and a character  
14 sequence unique to segment set names;

15 a position information read unit operable to identify  
16 a file to which a segment set corresponding to the specified  
17 segment set name belongs, and read, from the position information  
18 storage unit, pieces of position information corresponding to all  
19 segments belonging to the identified file, recognizing the read  
20 pieces of position information as a piece of position information



21 of the segment set; and

22 a segment set access unit operable to access the segment  
23 set in the file storage unit by referring to the piece of position  
24 information of the segment set.

1 11. The file management apparatus of Claim 10, wherein

2 each piece of segment position information includes (1)  
3 an address indicating a file start storage position of a file to  
4 which the segment belongs, and either (2-1) (a) an address offset  
5 indicating a size of a portion between the file start and a start  
6 of the segment and (b) an address offset indicating a size of a  
7 portion between the file start and an end of the segment, or (2-2)  
8 (a) an address offset indicating a size of a portion between the  
9 file start and a start of the segment and (c) a size of the  
10 segment.

1 12. The file management apparatus of Claim 11 further  
2 comprising:

3 a receiving unit operable to receive a segment set name  
4 obtainment request; and

5 a segment set name output unit operable to, after the  
6 receiving unit receives the segment set name obtainment request,  
7 refer to the position information storage unit and output to  
8 outside the file management apparatus a list of segment set names  
9 which each include (1) a file name of a file to which the segment

set belongs and (2) a character sequence unique to segment set names.

13. The file management apparatus of Claim 10, wherein each file includes a plurality of pieces of video data that have each been assigned a timecode, and

the file management apparatus further comprises:

a segment identifying unit operable to recognize each set of pieces of video data having consecutive timecodes as a segment; and

a position information creating unit operable to create pieces of position information that indicate storage positions of the identified segments in the file storage unit, and store the created pieces of position information in the position information storage unit.

14. A file management apparatus which stores and manages file storage positions in a one-to-one correspondence with file names and accesses files that correspond to specified file names, the file management apparatus comprising:

a file storage unit operable to store files which each include one or more segments that are each a logical unit;

a first position information storage unit operable to store pieces of position information that indicate file storage positions in the file storage unit, the pieces of position

10 information being in a one-to-one correspondence with file  
11 names;

12 a second position information storage unit operable to  
13 store pieces of position information that indicate segment storage  
14 positions in the file storage unit;

15 an access request receiving unit operable to receive an  
16 access request specifying an access target name;

17 a judgement unit operable to judge whether the access  
18 target name is a segment set name or a file name, each segment set  
19 being a set of all segments included in one file;

20 a position information read unit operable to read, from  
21 either the first position information storage unit or the second  
22 position information storage unit, a piece of position information  
23 corresponding to the access target name judged by the judgement  
24 unit; and

25 an access unit operable to access either a segment set  
26 or a file stored in the file storage unit by referring to the read  
27 piece of position information.

1 15. The file management apparatus of Claim 14, wherein

2 the judgement unit judges that the access target name  
3 is a segment set name when the access target name includes a name  
4 of a file stored in the file storage unit and a character sequence  
5 unique to segment set names.

1 16. A file management apparatus which stores and manages file  
2 storage positions in a one-to-one correspondence with file names  
3 and accesses files that correspond to specified file names, the  
4 file management apparatus comprising:

5 a file storage unit operable to store files which each  
6 include a plurality of pieces of data that have each been assigned  
7 a timecode;

8 a position information storage unit operable to store  
9 pieces of position information that indicate positions of free  
10 spaces in the files, each free space not storing a segment, and  
11 each segment being a set of pieces of data having consecutive  
12 timecodes;

13 an add request receiving unit operable to receive a  
14 segment add request which requests to add a new segment to a  
15 file;

16 a segment obtaining unit operable to obtain a new  
17 segment;

18 a position information read unit operable to read, from  
19 the position information storage unit, a piece of free space  
20 position information; and

21 a segment add unit operable to add the new segment to  
22 the file storage unit by referring to the read piece of free space  
23 position information.

1 17. A file management apparatus which stores and manages file

2 storage positions in a one-to-one correspondence with file names  
3 and accesses files that correspond to specified file names, the  
4 file management apparatus comprising:

5 a file storage unit operable to store files which each  
6 include a plurality of pieces of data that have each been assigned  
7 a timecode;

8 a position information storage unit operable to store  
9 pieces of free space position information that indicate positions  
10 of free spaces in the files, each free space not storing a  
11 segment, and also store pieces of segment position information  
12 that indicate positions of segments in the files, each segment  
13 being a set of pieces of data having consecutive timecodes;

14 an add request receiving unit operable to receive a  
15 segment set add request specifying (1) an add destination file and  
16 (2) a source file including a segment set which is to be added to  
17 the add destination file;

18 a position information read unit operable to read, from  
19 the position information storage unit, a piece of free space  
20 position information indicating a position of a free space of the  
21 specified add destination file;

22 a segment set extract unit operable to extract all  
23 segments included in the source file as a segment set by referring  
24 to the pieces of segment position information stored in the  
25 position information storage unit; and

26 a segment set add unit operable to add the extracted

27 segment set to the free space by referring to the read piece of  
28 free space position information.

1 18. A file management apparatus which stores and manages file  
2 storage positions in a one-to-one correspondence with file names  
3 and accesses files that correspond to specified file names, the  
4 file management apparatus comprising:

5 a file storage unit operable to store files which each  
6 include a plurality of pieces of data that have each been assigned  
7 a timecode;

8 a position information storage unit operable to store  
9 pieces of free space position information that indicate positions  
10 of free spaces in the files, each segment being a set of pieces of  
11 data having consecutive timecodes;

12 an add request receiving unit operable to receive a file  
13 add request specifying (1) an add destination file and (2) a  
14 source file which is to be added to the add destination file;

15 a position information read unit operable to read, from  
16 the position information storage unit, a piece of free space  
17 position information indicating a position of a free space of the  
18 specified add destination file;

19 a file add unit operable to add the source file to the  
20 free space by referring to the read piece of free space position  
21 information.

1 19. A file management apparatus which stores and manages file  
2 storage positions in a one-to-one correspondence with file names  
3 and accesses files that correspond to specified file names, the  
4 file management apparatus comprising:

5 a file storage unit operable to store files which each  
6 include one or more segments that are each a logical unit;

7 a position information storage unit operable to store  
8 pieces of position information that indicate segment storage  
9 positions in the file storage unit;

10 an access request receiving unit operable to receive a  
11 segment partial set access request specifying a file name and a  
12 condition, each segment partial set being a set of one or more  
13 segments in one file;

14 a position information read unit operable to read, from  
15 the position information storage unit, pieces of position  
16 information corresponding to all segments belonging to the  
17 specified file and satisfying the specified condition, recognizing  
18 the read pieces of position information as a piece of position  
19 information of the requested segment partial set; and

20 a segment partial set access unit operable to access the  
21 segment partial set by referring to the piece of position  
22 information of the segment partial set.

1 20. The file management apparatus of Claim 19, wherein

2 each file includes video data including portions that

3 have each been assigned a timecode, and

4 the file management apparatus further comprises:

5 a segment identifying unit operable to recognize each  
6 set of video data portions having consecutive timecodes as a  
7 segment; and

8 a position information creating unit operable to create  
9 pieces of position information that indicate storage positions of  
10 the identified segments in the file storage unit, and store the  
11 created pieces of position information in the position information  
12 storage unit.

1 21. A file management method for storing and managing file  
2 storage positions in a one-to-one correspondence with file names  
3 and accessing files that correspond to specified file names, the  
4 file management method comprising:

5 an access request receiving step for receiving a segment  
6 access request specifying a segment name, each segment being a set  
7 of pieces of data having consecutive timecodes among a plurality  
8 of pieces of data stored in a file storage unit;

9 a position information read step for reading, from a  
10 position information storage unit which stores pieces of position  
11 information that are in a one-to-one correspondence with segment  
12 names and indicate segment storage positions in a file storage  
13 unit, a piece of position information corresponding to the segment  
14 name specified in the segment access request; and



15 a segment access step for accessing a segment in the  
16 file-storage unit by referring to the read piece of position  
17 information.

1 22. A file management method for storing and managing file  
2 storage positions in a one-to-one correspondence with file names  
3 and accessing files that correspond to specified file names, the  
4 file management method comprising:

5 a file obtaining step for obtaining files which each  
6 include a plurality of pieces of video data that have each been  
7 assigned a timecode, and store the obtained files in a file  
8 storage unit;

9 a position information obtaining step for recognizing  
10 each set of pieces of data having consecutive timecodes as a  
11 segment, obtaining pieces of position information that indicate  
12 segment storage positions in the file storage unit, and storing  
13 the obtained pieces of position information in a position  
14 information storage unit;

15 a segment access request receiving step for receiving  
16 a segment access request specifying a segment;

17 a position information read step for reading, from the  
18 position information storage unit, a piece of position information  
19 corresponding to the segment specified in the segment access  
20 request; and

21 a segment access step for accessing the segment in the

22 file storage unit by referring to the read piece of position  
23 information.

1 23. A file management method for storing and managing file  
2 storage positions in a one-to-one correspondence with file names  
3 and accessing files that correspond to specified file names, the  
4 file management method comprising:

5 a file obtaining step for obtaining files which each  
6 include a plurality of pieces of video data that have each been  
7 assigned a timecode, and storing the obtained files in a file  
8 storage unit;

9 a segment identifying step for recognizing each set of  
10 pieces of video data having consecutive timecodes as a segment;

11 a position information creating step for creating pieces  
12 of position information that indicate storage positions of the  
13 identified segments in the file storage unit, and storing the  
14 created pieces of position information in a position information  
15 storage unit;

16 a segment access request receiving step for receiving  
17 a segment access request specifying a segment;

18 a position information read step for reading, from the  
19 position information storage unit, a piece of position information  
20 corresponding to the segment specified in the segment access  
21 request; and

22 a segment access step for accessing the segment in the

23 file storage unit by referring to the read piece of position  
24 information.

1 24. A file management method for storing and managing file  
2 storage positions in a one-to-one correspondence with file names  
3 and accessing files that correspond to specified file names, the  
4 file management method comprising:

5 an access request receiving step for receiving a segment  
6 set access request specifying a segment set name, each segment set  
7 being composed of all segments in a file, each segment set name  
8 including a name of the file and a character sequence unique to  
9 segment set names, and each segment being a logical unit;

10 a position information read step for identifying a file  
11 to which a segment set corresponding to the specified segment set  
12 name belongs, and reading, from a position information storage  
13 unit which stores pieces of position information that indicate  
14 segment storage positions in a file storage unit, pieces of  
15 position information corresponding to all segments belonging to  
16 the identified file, recognizing the read pieces of position  
17 information as a piece of position information of the segment set;  
18 and

19 a segment set access step for accessing the segment set  
20 in the file storage unit by referring to the piece of position  
21 information of the segment set.

1 25. A file management method for storing and managing file  
2 storage positions in a one-to-one correspondence with file names  
3 and accessing files that correspond to specified file names, the  
4 file management method comprising:

5 an access request receiving step for receiving a segment  
6 partial set access request specifying a file name and a condition,  
7 the segment partial set access request requesting to access a  
8 segment partial set which is a set of one or more segments  
9 satisfying the specified condition, and each segment being a  
10 logical unit and being included in a file stored in a file storage  
11 unit;

12 a position information read step for reading, from a  
13 position information storage unit which stores pieces of position  
14 information that indicate segment storage positions in the file  
15 storage unit, pieces of position information corresponding to all  
16 segments belonging to the specified file and satisfying the  
17 specified condition, recognizing the read pieces of position  
18 information as a piece of position information of the segment  
19 partial set; and

20 a segment partial set access step for accessing the  
21 segment partial set by referring to the piece of position  
22 information of the segment partial set.

1 26. A computer-readable record medium recording a file management  
2 program for storing and managing file storage positions in a one-

3 to-one correspondence with file names and accessing files that  
4 correspond to specified file names, the file management program  
5 comprising:

6 an access request receiving step for receiving a segment  
7 access request specifying a segment name, each segment being a set  
8 of pieces of data having consecutive timecodes among a plurality  
9 of pieces of data stored in a file storage unit;

10 a position information read step for reading, from the  
11 position information storage unit, a piece of position information  
12 corresponding to the segment name specified in the segment access  
13 request; and

14 a segment access step for accessing a segment in the  
15 file storage unit by referring to the read piece of position  
16 information.

1 27. A computer-readable record medium recording a file management  
2 program for storing and managing file storage positions in a one-  
3 to-one correspondence with file names and accessing files that  
4 correspond to specified file names, the file management program  
5 comprising:

6 a file obtaining step for obtaining files which each  
7 include a plurality of pieces of video data that have each been  
8 assigned a timecode, and store the obtained files in a file  
9 storage unit;

10 a position information obtaining step for recognizing

11 each set of pieces of data having consecutive timecodes as a  
12 segment, obtaining pieces of position information that indicate  
13 segment storage positions in the file storage unit, and storing  
14 the obtained pieces of position information in a position  
15 information storage unit;

16 a segment access request receiving step for receiving  
17 a segment access request specifying a segment;

18 a position information read step for reading, from the  
19 position information storage unit, a piece of position information  
20 corresponding to the segment specified in the segment access  
21 request; and

22 a segment access step for accessing the segment in the  
23 file storage unit by referring to the read piece of position  
24 information.

1 28. A computer-readable record medium recording a file management  
2 program for storing and managing file storage positions in a one-  
3 to-one correspondence with file names and accessing files that  
4 correspond to specified file names, the file management program  
5 comprising:

6 a file obtaining step for obtaining files which each  
7 include a plurality of pieces of video data that have each been  
8 assigned a timecode, and storing the obtained files in a file  
9 storage unit;

10 a segment identifying step for recognizing each set of

11 pieces of video data having consecutive timecodes as a segment;  
12 a position information creating step for creating pieces  
13 of position information that indicate storage positions of the  
14 identified segments in the file storage unit, and storing the  
15 created pieces of position information in a position information  
16 storage unit;

17 a segment access request receiving step for receiving  
18 a segment access request specifying a segment;

19 a position information read step for reading, from the  
20 position information storage unit, a piece of position information  
21 corresponding to the segment specified in the segment access  
22 request; and

23 a segment access step for accessing the segment in the  
24 file storage unit by referring to the read piece of position  
25 information.

1 29. A computer-readable record medium recording a file management  
2 program for storing and managing file storage positions in a one-  
3 to-one correspondence with file names and accessing files that  
4 correspond to specified file names, the file management program  
5 comprising:

6 an access request receiving step for receiving a segment  
7 set access request specifying a segment set name, each segment set  
8 being composed of all segments in a file, each segment set name  
9 including a name of the file and a character sequence unique to

10 segment set names, and each segment being a logical unit.  
11 a position information read step for identifying a file  
12 to which a segment set corresponding to the specified segment set  
13 name belongs, and reading, from a position information storage  
14 unit which stores pieces of position information that indicate  
15 segment storage positions in a file storage unit, pieces of  
16 position information corresponding to all segments belonging to  
17 the identified file, recognizing the read pieces of position  
18 information as a piece of position information of the segment set;  
19 and

20 a segment set access step for accessing the segment set  
21 in the file storage unit by referring to the piece of position  
22 information of the segment set.

1 30. A computer-readable record medium recording a file management  
2 program for storing and managing file storage positions in a one-  
3 to-one correspondence with file names and accessing files that  
4 correspond to specified file names, the file management program  
5 comprising:

6 an access request receiving step for receiving a segment  
7 partial set access request specifying a file name and a condition,  
8 the segment partial set access request requesting to access a  
9 segment partial set which is a set of one or more segments  
10 satisfying the specified condition, and each segment being a  
11 logical unit and being included in a file stored in a file storage



12 unit

13 a position information read step for reading, from a  
14 position information storage unit which stores pieces of position  
15 information that indicate segment storage positions in the file  
16 storage unit, pieces of position information corresponding to all  
17 segments belonging to the specified file and satisfying the  
18 specified condition, recognizing the read pieces of position  
19 information as a piece of position information of the segment  
20 partial set; and

21 a segment partial set access step for accessing the  
22 segment partial set by referring to the piece of position  
23 information of the segment partial set.

ADD A27